



A PAVII "HOW-TO" ASSESSMENT PAPER

# IDENTIFYING VISUAL IMPAIRMENTS IN INFANTS

by Gail Calvello

The purpose of this paper is to:

1. Identify problems associated with early diagnosis of vision impairment.
2. Describe physical indicators which constitute reasons to refer an infant to a pediatric ophthalmologist.
3. Define terms used to describe vision loss.
4. Offer a format for conducting a functional vision screening for infants.

## 1. FACTORS ASSOCIATED WITH DELAY IN EARLY DIAGNOSIS OF VISUAL IMPAIRMENT

A timely diagnosis may lead to remediation and/or prevention of additional vision loss. Although some visual impairments cannot be remediated, understanding the diagnosis should help parents to provide an early learning environment which is meaningful for the infant.

Visual impairments which involve anatomical abnormalities are readily identified at birth. Less obvious forms of visual impairment may not be diagnosed for several months. Factors which may contribute to a delay in diagnosis include:

- Misconceptions that infants do not see well for the first six months...  
"I always thought that babies couldn't really see clearly for months."
- Symptoms may not appear for several weeks...  
"His eyes were steady when he was first born; they started jumping around right after our trip back East."
- Symptoms may be intermittent...  
"The only time his eyes wiggle is when he's tired."
- Children who are "cortically blind" have relatively normal appearing eyes...  
"People tell me what beautiful eyes she has."

PAVII/IVI 1



- Parents may wait for the pediatrician to note any abnormalities...

"I thought the doctor would tell me if there was something wrong with Jamie's eyes."

- Parents may fear a diagnosis, particularly if an infant has other impairments...

"I couldn't stand the thought that one more thing might be wrong."

- Pediatric appointments are usually brief and may be focused on a specific purpose; the child may be sleepy or fussy, masking symptoms...

"Susie was either nursing or fussing during her doctor appointments; I don't think the doctor really saw her eyes for the first few visits."

- Well-baby appointments may not include vision screening...

"The nurse practitioner never asked about her vision - just about food, growth and immunizations."

- Vision problems may not be readily apparent in babies who have other physical impairments or developmental delays...

"I noticed that he didn't look at my face, but I just thought it was part of being premature."

## 2. REASONS TO REFER

If an infant or toddler exhibits any of these indicators, a referral should be made to a PEDIATRIC OPHTHALMOLOGIST, a physician who specializes in the diagnosis and treatment of children's eye diseases.

### EYE STRUCTURE

1. Coloboma - an irregularly-shaped pupil or iris; may have a keyhole shape.
2. Cataract - an opacity of the lens; looks like a white dot in the pupil; may be visible only when child moves eyes in a certain direction.
3. Corneal Opacity - a cloudy area on the clear surface of the eyeball.

### EYE MOVEMENT

1. Nystagmus - rapid or "wiggly" eye movements; may be vertical, horizontal or circular; does not appear until 6-8 weeks after birth.



2. Roving or drifting eye movements - slower than nystagmus with minimal or no attempts to focus.
3. Paradoxical pupil - pupil enlarges in bright light.
4. Strabismus - eye turns in or wanders out past midline; may appear to use one eye more than the other (amblyopia). Infants with wide nasal bridge may appear "cross-eyed" for the first few months (psuedo-strabismus).
5. Averted gaze - does not make eye contact; looks to the side or above another's face.

#### HEAD POSITION

1. Head tilt - consistently tilts head when focussing on an object; may be to either side or tipped up or down.
2. Field deficit - turns to objects on one side only or focuses at midline but not above or below; may notice objects in peripheral field but not at midline.

#### OTHER BEHAVIORS

1. Photophobia - in bright light, child may squint or close eyes, turn head away from light source; or eyes may water.
2. Perseverative behaviors - light gazing and hand - flicking may be associated with neurological problems, but visual impairment should be considered.

#### 3. VISUAL TERMINOLOGY: WHAT DO THOSE WORDS MEAN?

The following terms are often used in assessing and diagnosing an infant's vision loss. To most people, "blind" implies a complete loss of vision; however, some physicians and other professionals may use the word to refer to any serious visual impairment. ASK FOR DEFINITIONS.

1. Legal blindness - is a measurement of distance vision, not near vision. It is defined as visual acuity less than 20/200 in the better eye after the best possible correction; or a visual field limited to 20 degrees or less, even if the acuity is normal. 20/200 means that a person sees at 20 feet what an individual with normal vision sees at 200 feet. A visual field of 20 degrees is similar to looking through a narrow tube. Many people who are legally blind can read print at close range.



2. Partially-sighted or low vision - defined as distance visual acuity ranging from 20/70 to 20/200, in the better eye after the best possible correction. A person who is partially sighted may see better under some conditions than others. Lighting conditions are often important. A person who is partially sighted may have "foggy" vision, similar to what you might see in a misted mirror.

3. No light perception (NLP) - means without sight. It does not mean that the person sees darkness.

4. Cortical blindness or cortical visual impairment-refer's to the brain's inability to perceive or decode visual images. Cortical visual impairment is the result of a cerebral injury; the eyes and the optic nerves may be intact, but the visual cortex (which receives and decodes visual images) is affected. Visual functioning may range from no apparent vision to intermittent vision. The vision loss can be transient or permanent, depending upon the age at onset and the severity of the injury.

Legal or medical definitions rarely provide all the information about an infant's vision. We need to make our own observations, gather information from parents, and keep an open mind. An infant's diagnosis may not change, but the infant's ability to use residual vision may develop and dramatically impact visual behaviors. Moreover, many factors other than diagnosis or estimated acuity affect an infant's visual functioning, e.g. intellect, motivation, and emotional and physical environment. Infants often surprise and delight us with their ability to use their residual vision.

#### 4. FUNCTIONAL VISION SCREENING

##### PURPOSE

The purpose of the Functional Vision Screening Checklist is to provide a format to:

1. Identify visual skills
2. Identify variations from normal sequence of development
3. Share information with other professionals

Information obtained from the Functional Vision Screening can be used as a basis for encouraging the infant's use of functional vision.



## GUIDELINES

A functional vision screening describes how a child uses vision to interact with people and objects in the environment. Vision screening should be done in a familiar setting. Program staff can integrate screening activities while playing with the infant.

A functional vision screening should include:

1. Interviewing the caregiver about observations, questions and concerns
2. Observing the infant's typical interactions with people and objects
3. Setting up activities to observe specific skills

## SUGGESTIONS

- \* Be aware of the location and intensity of light sources. For optimal results, light source should be behind infant.
- \* Make certain the baby is securely positioned, e.g. lying on back or in an infant seat.
- \* Note visual distractions, e.g. examiner's clothing, patterns of light and shadow on the wall or floor, bands of light shining through window coverings or a curtain blowing in the breeze.
- \* Try to manage distractions, e.g. television or radio turned on, or children playing near the baby.
- \* Consider the infant's state: Is the baby alert, sleepy, fussy, hungry, recently ill?
- \* Be sensitive to the infant's social awareness. If the baby is fascinated with your unfamiliar face, use your face as the visual stimulus. On the other hand, if the infant is wary or afraid of strangers, ask the caregiver to elicit any behaviors you need to observe.
- \* Get the baby's attention by combining auditory and visual stimulation, e.g. your voice and face, or by shaking a colorful rattle. Then try to elicit responses with familiar, non-sound making toys. If the baby does not focus or track, use highly contrasting, bright, or shiny objects such as tin foil, costume jewelry, or tinsel. Next try filtered lights such as a pop bead over a penlight.



- \* Keep it simple. Too many colorful toys create visual clutter and may overwhelm the infant.
- \* Whenever attempting to elicit responses, end the activity with something the baby can do.

This paper and the accompanying Functional Vision Screening Checklist are based on the author's experience and a review of the following references:

- Barraga, N.C. (1980). Summary of research in visual impairment. Paper presented at the International Institute for Visually Impaired, Sun Valley, ID.
- Bayley, N. (1969). Manual for the Bayley scales of infant development. New York: The Psychological Corporation.
- Ferrell, K.A. (1986). Infancy and early childhood. In G.T. Scholl (Ed.), Foundation for education for blind and visually handicapped children and youth: Theory and practice. New York: American Foundation for the Blind.
- Hall, A.P., Kekelis, L.S., & Bayley, I.L. (1986). Development of an assessment program and intervention guidelines for visually impaired children. Unpublished manuscript, University of California, Center for the Study of Visual Impairment, School of Optometry, Berkeley.
- Hansen, R., Young, J., & Wrey, G. (1982). Assessment considerations with the visually handicapped child. In G. Ulrey & S. Rogers (Eds.), Psychological assessment of handicapped infants and young children. New York: Thieme-Stratton.
- Harrell, L., & Akeson, N. (1987). Preschool visual stimulation: It's more than a flashlight. New York: American Foundation for the Blind.
- Jan, J.E., Farrell, K., Wong, P.K., McCormick, A.Q. (1986). Eye and head movements of visually impaired children. Developmental Medicine and Child Neurology, 28, 285-293.
- Kavner, R.S. (1985). Your child's vision. New York: Simon and Schuster.
- Langley, B.M. (1980). Functional vision inventory for the multiply and severely handicapped. Chicago: Stoelting.
- Robertson, R., Jan, J.E., Wong, P.K.H. (1986). Electroencephalograms of children with permanent visual impairment. Canadian Journal of Neurological Sciences, 13, 256-261.
- Roland, E.H., Jan, J.E., Hill, A., & Wong, P.K. (1986). Cortical visual impairment following birth asphyxia. Pediatric Neurology, 2, (3), 133-137.



# FUNCTIONAL VISION SCREENING CHECKLIST

Name \_\_\_\_\_ Date of Birth \_\_\_\_\_

Date of Screening \_\_\_\_\_ Age \_\_\_\_\_

Informant \_\_\_\_\_ Observer \_\_\_\_\_

## SEQUENCE OF DEVELOPMENT

## OBSERVATION SUGGESTIONS

Check (✓) observed behaviors.  
Write "R" for reported behaviors.

### Birth - 1 month

Fixates on face and  
tracks with head and eyes

In face-to-face position, at 12"-  
18", does infant stare at  
caregiver's face? \_\_\_\_\_

Talk to the baby and move your  
face side-to-side, and up-and-  
down.

Does baby track with head  
and eyes? \_\_\_\_\_

NOTES:

\*Pupil constricts in  
bright light

Observe infant in dim and  
brightly lit areas.  
Does pupil react? \_\_\_\_\_

NOTES:

Observes movement in  
room

Does infant track family members  
or pets around room? \_\_\_\_\_

NOTES:

\*A responsive pupil does not imply visual system is intact.

PAVII/IVI 7

SEQUENCE OF DEVELOPMENT

OBSERVATION SUGGESTIONS

Birth - 1 month (continued)

Stares at light source

Does infant notice when lights  
are turned off or on? \_\_\_\_  
Patterns of sunlight on wall or  
floor? \_\_\_\_  
Turn toward light source? \_\_\_\_

Insert a penlight in a popbead.  
Does infant fixate on lighted  
bead? \_\_\_\_

NOTES:

---

2 months

Looks directly at caregiver's  
eyes

Observe infant in face-to-face  
interaction with caregiver.  
Is there eye contact? \_\_\_\_  
If not, does infant seem to focus  
slightly to the side, or above  
caregiver's eyes?

NOTES:

---

Watches lip movements

Does infant respond to normal  
and exaggerated lip movements  
(e.g. wide open mouth, tongue  
stuck out)? \_\_\_\_  
Does infant quiet \_\_\_\_,  
stare \_\_\_\_, imitate \_\_\_\_ ?

NOTES:



# SEQUENCE OF DEVELOPMENT

# OBSERVATION SUGGESTIONS

3-6 months

Watches own hand movements

If not observed spontaneously, facilitate position.  
Does infant stare at hand or watch hand movement? \_\_\_\_  
Ask caregiver if this occurred at an earlier age. \_\_\_\_ Hand regard is age-specific, and may not occur in an older infant.

NOTES:

Alternates gaze from one object to another

Hold two brightly colored blocks or popbeads 12" in front of infant's face. Gently shake one and then the other, several times.  
Is infant able to shift back and forth at least three times? \_\_\_\_  
If response is questionable, use rattles or bells.

NOTES:

\*Approaches mirror image

Hold mirror directly in front of infant, about 12" away.  
Does infant move head toward mirror? \_\_\_\_  
Stare/smile at mirror image? \_\_\_\_  
Reach toward mirror? \_\_\_\_

NOTES:

\* For all items which require a motor response, note if infant has impairments which would limit responses.

PAVII/IVI 9



## SEQUENCE OF DEVELOPMENT

## OBSERVATION SUGGESTIONS

3-6 months (continued)

Reaches for caregiver's face

In face-to-face position, does infant reach toward caregiver's mouth, nose, glasses? \_\_\_\_

NOTES:

---

Tracks rolling ball

With infant propped on tummy or in supported sitting, roll 1" ball across floor or table surface within infant's visual field.

Does infant track with head and eyes \_\_\_\_, with eyes alone \_\_\_\_?

Does infant stare at place where ball was last seen \_\_\_\_, or turn to look for ball when it is out of visual field \_\_\_\_?

NOTES:

---

Reaches for dangling toy

Suspend a plastic ring by bright yarn, within infant's reach. Does infant reach toward and grasp ring? \_\_\_\_

Dangle ring at midline and to both sides.

Is infant able to locate ring in each position? \_\_\_\_

Note if infant consistently over or underreaches.

NOTES:



## SEQUENCE OF DEVELOPMENT

## OBSERVATION SUGGESTIONS

### 7-10 months

Looks at small object, e.g.  
cheerio or raisin

Place object directly in front  
of infant, within easy reach.  
Does infant fixate on it? \_\_\_\_  
If not, point to and tap object  
to attract infant's attention.  
Or increase contrast, e.g., place  
object on a red placemat.

NOTES:

---

Attends to scribbling or  
writing

---

Seat infant on your lap while  
you are taking notes.  
Does infant watch as you  
write? \_\_\_\_ Attract infant's  
attention by tapping pen on  
paper; say "around and around"  
or "zip" as you make circles  
and straight lines.

NOTES:

---

Looks at pictures in book

---

Present infant with bright, clear  
pictures in a cardboard book.  
Does infant look at pictures? \_\_\_\_  
Vocalize \_\_\_\_ or point to  
pictures? \_\_\_\_

NOTES:



## SEQUENCE OF DEVELOPMENT

## OBSERVATION SUGGESTIONS

### 11-12 months

Explores depths by looking into containers

Drop a block in a coffee tin or cannister. Shake it and offer to infant.

Does infant peer into container? \_\_\_\_\_

NOTES:

Recognizes familiar objects across room (8-10 feet)

Place favorite toy (do not take from infant), across room, directly in front of infant. Does infant stare at toy? \_\_\_\_\_  
Vocalize \_\_\_\_\_, reach \_\_\_\_\_ or move toward it? \_\_\_\_\_

NOTES:

---

## **PAVII PROJECT – PARENTS AND VISUALLY IMPAIRED INFANTS**

### **Blind Babies Foundation**

50 Oak Street, Room 102 • San Francisco, CA 94102 • (415) 863-2250

Gail Calvello, M.A., Parent-Infant Educator

Development of this paper was supported by the Handicapped Early Children's Education Program, U.S. Department of Education, Grant #G008530067. However, the content does not necessarily reflect the position of the U.S. Department of Education and no official endorsement should be inferred.